



AFTAC

Air Force Technical Applications Center

Office of the Chief Scientist

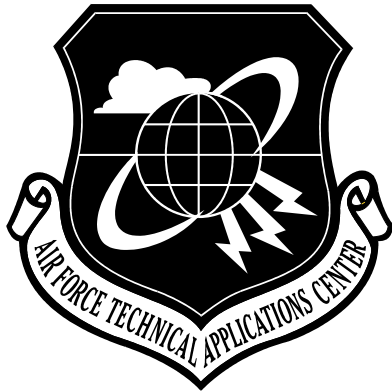
(U) Guide to Publishing AFTAC Scientific and Technical Reports

Richard M. Barone

12 June 2001

**Approved for public release;
distribution is unlimited.**





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(U) The Guide to Publishing AFTAC Scientific and Technical Reports has been reviewed and is approved for publication.



DAVID F. O'BRIEN
Chief Scientist


ROY E. HORTON III, Colonel, USAF
Commander

(U) The overall classification of this report is (*example only*):

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Preface

The Air Force Technical Applications Center (AFTAC), Scientific and Technical Information Office (STINFO) prepared this guide to assist in the publication of scientific and technical reports. It can be used by all those involved in writing, designing, editing, protecting, and disseminating technical reports. It is applicable to DoD contractors as well as AFTAC scientists, engineers, and analysts.

The publication of a technical report, just like the research upon which it is based, is an organizational function and should be subject to in-depth review and approval. While this guide is designed to provide helpful information on writing and organizing a technical report, it is not a substitute for expert editorial assistance. Errors in grammar, format, design, and classification are often easier for an experienced editor to detect. This is especially true at AFTAC where compliance with specific publication formats and design is required.

This guide follows its own guidance and can be used as a sample technical report. Links within the guide will alert you to more specific guidance or instructions.

Publication of a technical report is a time-consuming process and it is to the author's benefit to work closely with a competent editor. I am very fortunate to have had the editorial assistance of Linda Felton of TMRP. (Even editors need to be edited.) With the assistance of a competent editor, technical reports can become 100% error free.

Users of this guide are encouraged to submit comments and suggestions to the author via e-mail:
richard.barone@aftac.patrick.af.mil.

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Guide to Publishing AFTAC Scientific and Technical Reports

Summary

This guide provides publishers of AFTAC scientific and technical reports with information that will ensure compliance with DoD directives, American National Standards Institute (ANSI) standards, and Air Force instructions. It acts as a sample technical report, *per se*. It explains and illustrates proper document organization, design, classification, secondary distribution, and bibliographic format.

1. Introduction

Scientific and technical reports are the primary criteria upon which customers will judge the value of AFTAC's research mission and the validity of initiating future projects. If they are well organized and clearly written, they will be accepted as the results of sound analyses and observations. If they are disorganized and flawed with errors in grammar and punctuation, they will be considered to be the products of a careless or incompetent organization.

Taken together, the technical reports produced by AFTAC represent its research and development achievements. And because technical reports are applicable beyond the boundaries of AFTAC, they must be written in a communicative style and conform to adopted standards for uniform presentation and bibliographic control.

Section 4 provides detailed descriptions and samples of the elements required in the preparation, organization, and distribution of technical reports. Hot links to all applicable

forms and instructions have been provided. More detailed information on STINFO and assistance in the publication process is available in the STINFO office, BN-101, 494-3871.

2. Types of Reports

DoD directives and coordinating AF instructions require that the results of scientific research, development, testing, and evaluation (RDT&E) be documented by written scientific and technical reports. This requirement includes in-house and contractual efforts and holds true even if the efforts were unsuccessful.

CENI 61-201 requires that the results of RDT&E conducted by or sponsored by AFTAC be published by scientific and technical reports or informal technical reports. The management of the publication process will normally be the responsibility of the project officer assigned to the effort.

A scientific & technical report (TR) is a publication that records the results of analytic studies, research, development, test, and evaluation on an assigned task. It may be definitive, exploratory, or evaluative in purpose. Its format is governed by Data Item Description (DID) 80711A. Documents that are not published (do not have an author—personal or corporate, and/or publisher—OPR), research proposals, technical manuals, technical specifications, purely technical data, and research papers that are prepared for publication in journals are not considered TRs.

A technical report (informal) is a written account of studies, analyses, or evaluations intended to improve the operations, management, or administration of an organization. Its format is governed by Data Item Description (DID) 80508.

3. Technical Writing

The primary responsibility of the technical writer is to convey information so clearly, the reader cannot misunderstand what is in the report. In deciding what information to present, the writer must take into account what readers already know and what they need to know. The technical writer should work hard to tailor scientific language to match the knowledge levels of the readers.

The value of any technical report lies in its ability to present analyses of technical data, evaluations of methods or systems, and new solutions to operational problems. Because the subject matter of a technical report tends to be very complex and esoteric, the writer should use an expository writing style and chose a format that moves the reader from the simple to the complex in content and vocabulary. To accomplish this, the writer should plan the report very carefully. The report should be divided into sections that are numbered consecutively. Paragraphs are usually shorter than in other types of writing, and figures, tables, and charts are used extensively.

American National Standards Institute (ANSI) Z39.18-1995, *Scientific and Technical Reports—Elements, Organization, and Design*, has been carefully written to provide the technical writer with a format that fosters uniformity, “while allowing for diversity of subject matter, purpose, and audience.”¹ The use of this format will make the report useful to several different customers and will ensure “thorough, consistent, and uniform bibliographic description, and control of data essential to libraries...”¹

and other organizations that utilize the RDT&E prepared by AFTAC. **All AFTAC scientific and technical reports must be prepared in accordance with this standard. ANSI Z39.18-1995 is available in PDF format on the STINFO Home Page.**

4. AFTAC Technical Report Format

The ANSI format requires the following sequence of report elements:

- I. Front Matter:
 1. Cover*
 2. Title Page
 3. Notices
 4. Report Documentation Page (SF-298)
 5. Abstract
 6. Table of Contents
 7. List(s) of Figures and Tables
 8. Foreword*
 9. Preface*
 10. Acknowledgments*
- II. Text (Body):
 1. Summary
 2. Introduction
 3. Methods, Assumptions, and Procedures
 4. Results and Discussion
 5. Conclusions
 6. Recommendations*
 7. References
- III. Back Matter:
 1. Appendixes*
 2. Bibliography*
 3. List(s) of Symbols, Abbreviations, and Acronyms
 4. Glossary*
 5. Index*
 6. Distribution List

* Indicates optional elements.

4.1 Cover (optional)

The purpose of a cover is to protect the printed (paper) report. If a cover is used, it must contain the same information that is found on the title page. Reports that are bound or covered in a binder should be treated the same way, and the spine should also contain the title and

1. *Scientific and Technical Reports — Elements, Organization, and Design*. AWSI/NISO Z39.18-1995. Bethesda, MD: NISO Press, 1995. v.

classification marking. Covers to non-print reports (CD-ROM and other media) should be treated the same way, if they act as permanent storage containers. AFTAC's generic cover, prepared in Adobe FrameMaker (see [cover](#)), is the preferred cover for scientific and technical reports, and can be used by any directorate.

4.2 Title Page (required)

The purpose of the title page is to describe the technical report and maintain bibliographic control. Without bibliographic description, a document would not be officially published and available for distribution. In addition, it could not be cataloged and stored in a library or information system.

The required data elements of a title page are:

1. Report number. This is assigned by the STINFO Manager for in-house reports and by the contractor for contract reports.
2. Report title. If the title is classified, there must also be an unclassified short title.
3. Series title and number, if the report is part of a series of reports.
4. Author(s), principle investigator, editor, and/or compiler. The primary author always comes first. Signature blocks are not used, and only the full name is required. Military ranks are not required, but should accompany the author's name on the Report Documentation Page, SF-298. Use the abbreviations for rank as shown in *The Tongue and Quill*, AFH 33-337.
5. Performing organization (author affiliation).
6. Publisher (AFTAC directorate and division), publication date (assigned by STINFO Manager upon completing review), and place of publication.
7. AFTAC logo.
8. Copy number for distribution control, e.g., 12 of 32 copies.
9. Contractor name and address.
10. Contract or grant number.
11. Distribution Statement. See 4.3, Distribution Statement.

4.3 Distribution Statement (required)

In order to control secondary distribution of a technical report, an official distribution statement should be used on the cover, title page, and Report Documentation Page,

SF-298. The official DoD distribution statements and the reasons for their use are found in [Appendix B](#).

A distribution statement consists of four elements:

- Distribution level (A, B, C, D, E, F, X)
- Reason that the data is restricted from public release (Statement A has no reason since it is not restricted, as shown on the [title page](#) of this technical report)
- Date of determination (when the statement and reason were selected)
- Identity of the DoD controlling office (statement A has no DoD controlling office since the material has been cleared for public release)

It is not necessary to put the code level on the title page, but it should be included on the SF-298. It is not necessary to use the complete mailing address, for this is found on the SF-298. Some examples of distribution statements are:

- F - Further dissemination only as directed by AFTAC/TM, 1 April 2001, or higher DoD authority.

(Distribution statement F is normally used on classified technical reports, and, therefore, a reason is not required. When ORCON is used to control the report, the only person authorized to approve further dissemination is the AFTAC commander, AFTAC/CC.)

- D - Distribution authorized to DoD components and their contractors only; administrative/operational use; 1 April 2001. Other requests for this document shall be referred to AFTAC/TT.

Complete instructions on selecting and writing distribution statements are contained in *A Quick Reference for Marking DoD Technical Documents* (U.S. Department of Defense 1998).

4.4 Approval Statement (required)

An approval statement must appear on the verso of the title page and include the signatures of the director and AFTAC commander. Use official signature blocks.

4.5 Notices (required)

Special notices regarding classification, dissemination, proprietary information, and export warnings, should be located on the verso of the title page below the approval statement and signatures.

4.6 Report Documentation Page, SF-298 (required)

A complete SF-298 must be included as the first right-hand page after the title page and should be numbered as page iii. Do not exceed the limits of block 14 for the abstract and do not use the back of the form for continuations. The distribution statement shown in block 12 should be the same as on the cover and title page, as should the report title(s), number, date, and author(s). For in-house reports, put the complete mailing address in block 7, including the office symbol. If the report is classified, put the “derived from” statement in block 13, Supplementary Notes. Put only the overall classification (without SCI caveats and DCID 1/7 markings) in blocks 16a–c. Block 17 is either UU (Unclassified Unlimited) or SAR (Same As Report). Block 19a is usually the author for in-house reports or the project officer for contractor reports. Include as many subject terms (keywords) in block 15 as will fully describe the contents of the report. Two versions of SF-298 are available on the AFTAC Intranet under AFEPL: Word and FormFlow. Detailed instructions for filling out the SF-298 are found on the back of the form. A sample is included at Appendix C.

The purpose of an SF-298 is to provide bibliographic control for the technical report and to facilitate its classification and dissemination.

4.7 Abstract (required)

The purpose of an abstract is to provide a summary of the research and to assist readers in determining the value of reading the text. The abstract should never contain information not found elsewhere in the text, and should not refer the reader to sections contained in the text. It is recommended that the abstract be no larger than 200 words. The abstract found in the Report Documentation Page, SF-298, can be used in place of a separate abstract section. ANSI/NISO Z39.14-1997, *Guidelines for Abstracts*, is the standard guide for preparing abstracts for scientific and technical reports.

4.8 Table of Contents (required)

The table of contents begins on page v and is titled simply Contents. It includes the title and beginning page number of each section and subsection of the report. Subsections are indented differently from the main sections and may be set in another type style. Third-level subsections are not required, but if they are listed, all the subsections must be

listed, not just a few selectively. Include any appendices, lists (distribution, references, abbreviations, symbols, acronyms, etc.), indexes, bibliographies, or glossaries.

4.9 List(s) of Figures and Tables (required for five or more)

If a report contains five or more figures or five or more tables or a combination of figures and tables totaling five or more, a list of figures and/or a list of tables is included with its corresponding page numbers. (See Figures and Tables sections below.) Otherwise, the lists are optional. If the table of contents does not exceed half a page, a list of figures, a list of tables, or a list of figures and tables can be placed on the bottom half of the same page.

4.10 Foreword (optional)

This is a statement about the report that is written by someone other than the author. It should include the name and affiliation of the writer.

4.11 Preface (optional)

A preface defines the intended audience and states the purpose and scope of the report, often highlighting specific projects or programs. It may also include recognition of persons who assisted in research, development, testing, or evaluation. The preface does not summarize the problem, or state the conclusions of the report.

4.12 Acknowledgments (optional)

An acknowledgment section is used when recognition of technical assistance is too lengthy to include in the preface.

4.13 Summary (required)

The summary clearly states the problem, the key points of the report, important results, conclusions and recommendations. The summary should never introduce material not found elsewhere in the text. It does not contain references. If a report exceeds 50 pages in length, a separate “executive summary” is prepared for management-level audiences.

4.14 Introduction (required)

The introduction presents the background, purpose, problem being addressed, and scope of the research, test, or evaluation. It states the reasons for the investigation and its limitations.

4.15 Methods, Assumptions, and Procedures (required)

This is the main body of the report and describes the research in depth. The description usually moves from simple to complex in vocabulary and content, so that several different levels of readers can benefit. Items that should be identified and explained are 1) system of measurement, 2) description of instruments or equipment used, 3) parameters for testing and evaluation, and 4) methods and procedures used to obtain technical data.

4.16 Results and Discussion (required)

The findings of the RDT&E and a discussion of their significance can be presented together in one section or separately. The discussion section tells how accurate the testing and measurement were and how significant this might be to the purpose of the research. Technical data used to directly support the results are included in the results section via tables and figures. Technical data that are not essential to the understanding of the results are included in an appendix.

4.17 Figures and Tables (required)

Technical data are always presented in a scientific and technical report by means of figures and tables. The formats presented in ANSI Z39.18-1995 sections 5.2.1 and 5.2.2 are followed. Generally, a table or figure should not exceed the normal margins of the document; the font size is usually smaller than the normal text to accommodate this (8 points is recommended). Figures and tables should be numbered consecutively in Arabic numerals preceded by the word, Figure or Table. Do not use section numbering. Figures and tables appearing within an appendix should be numbered using the appendix designation, e.g., Table A-1 for the first table in Appendix A. Each figure and table should have a title, which follows the number. The table number and title appear on top of the table and all major words in the table's title should be capitalized. The figure number and title appear on the bottom of the figure and only the first word of the figure's title is capitalized. The column headings in a table are capitalized, but not the whole word.

4.18 Conclusions (required)

The purpose of the conclusions section is to provide the author's assessment of the results or findings. Were the goals and objectives of the RDT&E achieved? If the

conclusion includes the author's opinion, the heading should be "Concluding Remarks."

4.19 Recommendations (optional)

The author may suggest a course of action, such as additional RDT&E, alternate methods and approaches, or production/operational considerations. It is recommended that a bullet format be used.

4.20 References (required)

The author-date format is preferred. List all citations alphabetically by author's last name, followed by the year of publication. Additional bibliographic information should include title (in italics), place of publication, and publisher. If the work cited is a periodical article, the title of the article should be in quotation marks and the title of the journal, magazine, or newspaper in italics. Periodical volume, issue, and page numbers should be included. If the work cited is a government document (NTIS; DTIC), include the report number. The references section should appear on a separate page in the technical report. References should be portion-marked like the rest of the report, and the classification of the original document must be included at the end of the citation.

If the author-date format is not feasible (e.g., too many references with no authors), use the number-identification system in which Arabic numbers are used in the text to refer to numerically listed citations in the references section. Citations should contain complete bibliographic information as shown in the sample on page 13.

If footnotes are used, the author-date format should also be used, so that there is only one numbering system for references.

The Chicago Manual of Style is the guide that governs bibliographic format for all scientific and technical reports published by AFTAC (*The Chicago...* 1992). Classified titles should never be referenced in an unclassified report. If the references section contains unclassified citations to classified documents or technical reports, it should be labeled "For Official Use Only."

Sample citations have been provided in the [References](#) to this report.

4.21 Appendixes (optional)

Supplemental information not essential to understanding the report is contained in an appendix; i.e., extensive technical data obtained during RTD&E, texts of supplementary documents, test procedures, equipment manuals, or instructions. Each appendix should begin on a new, right-hand page, and be labeled with a title that appears just below the heading. Multiple appendixes must be labeled with capital letters; i.e., Appendix A, Appendix B. Figures, tables, and equations contained in an appendix must be numbered sequentially in each appendix; e.g., B-1, B-2.

4.22 Bibliography (optional)

Citations to information sources not referenced in the text of the report are contained in a bibliography. A bibliography is a list of sources recommended by the author(s) for further research. It should be alphabetically arranged by author's last name. Sample citations have been provided in the [Bibliography](#) to this report.

4.23 List of Symbols, Abbreviations, and Acronyms (required)

If there are more than five symbols, abbreviations, and acronyms in the text, or if some readers might not know them, a list showing their meanings is required. The list should begin on a new, right-hand page, be properly labeled, and be marked as a table or distribution list.

4.24 Glossary (optional)

This section defines and explains unfamiliar terms used in the report. It is arranged alphabetically and is marked like a table or distribution list.

4.25 Index (optional)

If the report is over 50 pages, an index of key terms and names is recommended. An index normally includes subjects and names of persons, places, things, and shows the pages on which they are found.

4.26 Distribution List (required)

This section provides a permanent record of the initial distribution of the report. It should be marked like a table in accordance with AFTAC classification guidance. It is arranged by relative importance of addressees, with internal distribution being listed at the end. Each

entry should have a complete mailing address (for external) along with the number of copies distribution. A distribution list is very important, for it can be later used to forward instructions regarding classification changes or corrections/amendments to the original document.

5. Technical Report Design**5.1 Figures**

Graphs, charts, maps, diagrams, photographs, and schematic drawings must conform to the design standards stated in ANSI Z39.18-1995, section 5.2.1. In addition, figures contained in classified reports must be portion marked with the classification shown above and below the figure, preferably outside the area of the figure itself. The title of the figure should also be portion marked. The figure number and title should be placed below the figure, and only the first word of the title should be capitalized. See Figure 1 for sample format.

SECRET//X1



(UNCLASSIFIED sample—for training purposes only)

SECRET//X1

Figure 1. (U) State map

5.2 Tables

Technical data or statistics that need to be displayed in row-and-column format (spreadsheet) should conform to the tables standard stated in ANSI Z39.18-1995, section 5.2.2. In addition, tables contained in classified reports must be portion marked with a statement directly below the title of the table. All the nouns in the title and column (and row) headings should be capitalized. See Table 1 for sample format.

Table 1. (U) Analysis of Sample 1*(This table is UNCLASSIFIED)*

Element	Concentration (weight percent)	Relative Standard Deviation (percent)
Fe	66.3	1.5 ^{a/}
Cr	16.8	2.2
Ni	11.8	4.2
Si	2.8	26
^{a/} Table footnote		

5.3 Numbering

All front pages (title page, SF-298, abstract, table of contents, lists of figures and tables, foreword, preface, acknowledgments) are numbered with lower case Roman numerals (ii, iii, iv...). The title page is always page i, but the numeral is not shown. The text or body of the report, including references section, appendixes, bibliography, blank pages, list of acronyms etc., and distribution list should be numbered consecutively in Arabic numerals (1,2,3...). Numbers should be at the bottom center of each page. The cover is not numbered.

Each major section of a report begins on a new, right-hand page. This includes the title page, references, bibliography, appendixes, list of symbols and abbreviations, and distribution list. Blank pages must be marked: *This page intentionally left blank*.

The body of the report should be outlined using headings and subheadings that are numbered consecutively using points for each subdivision. (This is not a decimal system for the numbers are whole, not fractions.) For example:

- 1. (U) World Wars
 - 1.1 (U) World War I
 - 1.2 (U) World War II
 - 1.2.1 (U) European Theater
 - 1.2.2 (U) Pacific Theater
 - 1.2.2.1 (U) Battle of the Coral Sea
 - 1.3 (U) World War III

Enumeration should not exceed five levels deep for reports shorter than 50 pages. There may be multiple paragraphs under a subheading and they need not be numbered. However, it is acceptable to number every paragraph, which has its advantages in some types of publication

formats, like html. Headings and subheadings should be printed in bold font style.

For enumerations within a single sentence, use numbers followed by a right parentheses as shown in 4.15, Methods, Assumptions, and Procedures. Use commas for separation of enumerations within a sentence of four lines or less. Use semicolons to separate enumerations within lengthy sentences (more than six lines).

5.4 Formats

The following formats are intended to facilitate uniformity in the publication of AFTAC technical reports. These formats can be accomplished with either Word or FrameMaker, but the latter is recommended.

5.4.1 Document

- Adobe Portable Document Format (PDF) is recommended, for it can be viewed on Microsoft Windows, Mac OS, and UNIX platforms in its original publication format and design without having to be changed. Because it incorporates custom hyperlinks, PDF is more compatible with Web search engines and the development of digital libraries. Also, PDF contains security features not available with Word or html. These protections will ensure the authenticity of the document upon secondary distribution.

5.4.2 Page

- 8.5 x 11, white paper (or background), portrait
- Two-column format is highly recommended: 3 ¼ inches wide, 8 ½ inches long; gutter is ¼ inch. This allows for easier reading and more efficient use of space.
- Text begins 1 ¼ inch from top of page
- Pages are offset left-right: 1 inch inside margin, ¾ inch outside margin
- CAPCO markings are centered ¼ inch from top and bottom of page
- Page number is centered, ¾ inch from bottom of page
- TR number is ¾ inch from top of page, offset left-right on the outside of the page

5.4.3 Paragraph

- Alignment is left, no indentation

- One space after punctuation (period, colon, etc.)
- One line between paragraphs
- Alignment left, ragged right

5.4.4 Sentence

- Quotation marks are outside of commas, periods, question marks, and semi-colons

5.4.5 Word

- Body text is 10 points, Times New Roman, black, regular font
- Main section headings are 11 points, bold; subheadings are 10 points, bold
- CAPCO headings (top and bottom of page only), and title (cover and title page) are 16 points, bold font
- Short title (cover and title page) is 14 points, bold font
- Text inside tables is 8 points, regular font
- Titles of books, periodicals, and published technical reports are in italic font

6. Technical Report Marking

All classified technical reports must be portion marked according to DODD 5200.1–R, DODD 5200.1–PH, and AFI 31-401. Each page should be marked with the highest portion classification on that page, rather than the overall classification of the technical report. This selective marking of pages will ensure the widest availability of scientific and technical information, which is mandated by DODD 3200.12. It is DoD policy to provide “maximum contribution to the advancement of science and technology...and eliminate unnecessary duplication of effort and resources by encouraging and expediting the interchange and use of STI.”² The overall classification of the technical report must be placed on the front cover, title page, and back cover.

In addition to classification markings, distribution statements should be used to limit the secondary distribution of technical reports that contain sensitive and proprietary information. See 4.3, Distribution Statement. Complete instructions on selecting and writing distribution

2. U.S. Department of Defense Directive, *DoD Scientific and Technical Information (STI) Program (STIP)*. DODD 3200.12, February 11, 1998, section 4.1.

statements are contained in *A Quick Reference for Marking DoD Technical Documents* (U.S. Department of Defense 1998).

Additional reminders:

- Control markings on the top and bottom of each page must be written out and not abbreviated.
- When using “multiple sources,” document all the classification guides that apply, preferably on the notices page.
- Use only the most restrictive declassification symbol on overall classification markings; e.g., use SECRET//X1, not SECRET//X1,X6.

7. Technical Report Editing, Review, and Approval

7.1 Editing and Review

The editing and review process will vary amongst directorates, but there are three general stages in the cycle that should be followed.

The first stage would be a branch review to ensure accuracy of technical data and information. Technical errors are less frequent than grammatical errors, but they are the most dangerous. These must be spotted in the first stage, for reviewers do not have the facility to check data once the report leaves the originating office. Essential at this stage is report classification and marking to properly protect the document.

The second stage would be a division review that includes the assistance of an editor or someone skilled in proofreading to correct grammatical and technical errors. The editor must communicate well with the author so that changes have not distorted the original meaning of the text. Editors must be careful not to forsake meaning for clarity. Conformity to ANSI Z39.18 is checked at this stage and the document is usually converted from draft to page layout format, and a clean copy sent to the Division Chief for approval.

The third stage would be directorate approval and submission to the STINFO manager for review. STINFO review involves checking of classification markings, SF-298, distribution statement, grammatical errors, and all the report elements listed in this guide. Since editing at this stage is usually light, the report is submitted to the Chief Scientist for review and approval. The author will be notified if clarifications have to be made.

To ensure the highest quality of AFTAC technical reports, it is highly recommended that each directorate:

- Establish a structure to the editing cycle that will ensure consistent degrees of editing. Appoint a technical editor who has a strong writing background, and a fact checker who can double check technical data. If an editor cannot be appointed, solicit the services of the STINFO manager to act as the initial (in-depth) editor.
- Ensure the greatest diversity possible in the review process. All reports need to be reviewed, and the branch staff might not have the knowledge to catch all the errors or misrepresentations. For example, a statistician can provide invaluable comments on data validity and presentation.
- Ensure that the author sees any editorial changes up until the time that the published version is distributed.

If these suggestions are implemented, authors will become more responsible for their work and major revisions will become less frequent.

7.2 Proofreading and Editing Tips

- Slow down your reading rate.
- Proofread technical data twice.
- Read numbers digit by digit rather than in tens, hundreds, thousands, etc.
- Use a partner to proof numbers that are in tables. Read the figures aloud and have your partner mark the corrections and changes on the copy being proofread.
- Keep numbers in columns properly aligned under decimal points.
- Use a screen (a blank sheet of paper to cover the material not yet proofed).
- If using MS Word, use the “track changes” feature under Tools to make comments apparent to other reviewers.
- Read backwards to focus on spelling of words.

The following proofreading symbols are used at AFTAC:

^ insert copy

≡ capitalize

✂ delete, omit

add a space

start a new paragraph

no# remove paragraph break

⊙ insert a period

/ cross out mistake, write the correct letter above
make lower case

When editing a document, it is appropriate to correct spelling mistakes directly on the draft. If you are not sure of the spelling, add a question mark to the correction.

8. Grammar

The rules of grammar in *The Tongue and Quill*, AFH 33-337 should be followed in writing technical reports. However, because technical reports must conform to the format in ANSI Z39.18-1995, certain conflicts of grammar, punctuation, and capitalization might arise. In this case, consult the STINFO Manager for assistance.

8.1 Numbers

Follow the guidance in *The Tongue and Quill* on how to express numbers in a document. Be careful when using numerical figures in place of words. (See pages 275–280 for specific examples.) Note that plurals of numbers are formed with the addition of an “s;” e.g., the 1960s (never 1960’s), or 500s (never 500’s).

8.2 Units and Equations

Follow the guidance in ANSI Z39.18-1995 on the standard format for units of measurement (section 5.5) and for formulas/equations (section 5.6).

8.3 Punctuation

Follow the guidance in *The Tongue and Quill* on how to use punctuation marks. (See pages 225–256 for specific examples.) In addition, be aware of the following caveats:

- Comma: note 2, page 231 prefers to leave off the comma before the final conjunction in a series of words. This practice might lead to an ambiguity. For example, “*We will divide the \$100 amongst John, Bill, Mary, and Sue*” might be construed differently than “*We will divide the \$100 amongst John, Bill, Mary and Sue.*” It could be argued that in the first instance each person gets 25%, but in the second

Mary and Sue must share one-third, whereas John and Bill each get one-third.

- Dashes: Use an en dash rather than a hyphen to indicate continuing numbers, dates, or times; e.g., Figures 2–7 (not Figures 2-7). When using words to express the continuation, be consistent and don't use the dash; e.g., between 1966 and 1968 (*never* between 1966–1968), or from 1000 to 1215 (*never* from 1000–1215).

8.4 Abbreviations

Follow the guidance in *The Tongue and Quill*, pages 257–262. Be consistent throughout the report. Dates should be fully abbreviated or spelled out. Use 10 Apr 01 or 10 April 2001 (not 10 Apr 2001 or 10 April 01)—fully spelled out is preferred. For other abbreviations, use the *United States Government Printing Office Style Manual 2000*. When abbreviating units of measure, eliminate internal and terminal punctuation. If there is an ambiguity (e.g., in for inch), spell out the word.

8.5 Capitalization

Use the *United States Government Printing Office Style Manual 2000* to determine proper capitalization of words. Hard copies can be purchased through the STINFO office; it is also on the Internet at <http://www.access.gpo.gov/styleman/2000/style001.html>.

8.6 Collective Nouns

Be careful with collective nouns like team, committee, board, group, and number. These are singular words that refer to groups of specific people or things. Use a singular verb and pronoun. *The committee likes to take its break in the cafeteria.* When casual shifts in number occur, they are certain to look awkward in formal writing. *The staff praises itself for improving productivity, yet the supervisor berates them for bad conduct.* To be consistent, change the collective subject. *The members of the staff praise themselves for improving productivity, yet the supervisor berates them for bad conduct.*

As a general rule, if the group is acting as one unit, use a singular verb. If members of the group are acting separately, use a plural verb. *The jury has reached a decision. The jury members have not reached a decision.*

8.7 Words

Affect/effect

- Affect is a verb meaning to alter, influence, change. *The instrument's effect on the environment will affect how we will use it.* (The noun form of the word affect is seldom used.)
- Effect is a noun meaning impression or results. It is also a verb meaning to cause. *The instrument will effect a change in the way we measure temperature.*

Data is/data are:

- Data is the plural form of datum, but it can be used as a singular word, e.g., *...until more data is available.*

His/her

- If both male and female are involved, it is better to change the wording from singular to plural. Instead of saying, *each manager must meet with his/her staff*, use the plural form: *managers must meet with their staffs*. And do not use the hybrid s/he. Use the pronouns they or you instead. Use inclusive language as much as possible but avoid mistakes like the following, which appeared in the *Missileer*: *After a civilian attends four classes..., they will be awarded a certificate of completion...*

Active versus Passive Voice:

- Create dynamic and powerful writing by using active rather than passive verbs. The active voice is preferred because the passive is more wordy and roundabout, it muddles the meaning and hides responsibility, and it is unnatural and dull. Microsoft Word will automatically prompt to change passive to active, but this does not mean the passive is incorrect or always bad. The passive voice is appropriate when:
 - "Doer" is unknown. *The unit was built in 1952.*
 - "Doer" is unimportant. *The unit was shipped yesterday.*
 - "Doer" is better left unsaid. *The samples were collected yesterday.*

9. Contractor Reports

Contractors prepare technical reports according to the guidance contained in two Data Item Descriptors (DIDs): DI-MISC-80711A and DI-MISC-80508. If the contract requires that the results of RDT&E be documented by an in-depth scientific and technical report, the instructions contained in DID 80711A should be followed.

DID 80711A requires compliance with the format in ANSI Z39.18-1995, *Scientific and Technical Reports—Elements, Organization, and Design*. If the contract requires that the results of RDT&E be documented by an ordinary technical report (studies/analyses performed), the instructions in DID 80508 should be followed. DID 80508 does not require compliance with Z39.18-1995 and the contractor's format is acceptable.

10. Conclusions

The credibility of a research project depends upon the quality of the final scientific and technical report. Without discernible organization, good grammar, and error-free punctuation and spelling, a technical report will not be convincing. In order for a technical report's message to be acceptable, it must be clear and concise, and free from ambiguities and mistakes. In order for statistical comparisons and technical data to be credible, well-designed and properly documented tables and figures should be included.

Customers read technical reports to see what information they can use. They favor well-organized reports that "deliver the goods." They dislike disorganized and faulty reports that waste time and money, and worst of all, inaccurate or unclear reports that might lead to injury, damage, or loss of life.

Appendix C is a checklist to assist in publishing technical reports. But to ensure the best possible product, an editor should review and guide the draft to final publication.

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Appendix A

STINFO Instructions and Directives

AFI 31-401, Information Security Program Management

AFI 33-360V1, Attachment 4, Editorial Guide for Drafts and Guidance for Preparing, Reviewing, and Editing Publications

AFI 61-201, The Local Scientific and Technical Information Process

AFI 61-202, United States Air Force Technical Publications Program

AFI 61-204, Disseminating Scientific and Technical Information

AFI 61-205, Sponsoring or Cosponsoring, Conducting, and Presenting DOD-Related Scientific Papers at Unclassified and Classified Conferences, Symposia, and other Similar Meetings

AFI 61-302, Cooperative Research and Development Agreements

AFPD 61-2, Management of Scientific and Technical Information

AFPD 61-3, Domestic Technology Transfer

CENI 61-201, Scientific and Technical Information (STINFO) Management

DODD 3200.12, DoD Scientific and Technical Information Program

DOD 3200.12-R4, Domestic Technology Transfer Program Regulation

DODD 5200.1-R, Information Security Program Regulation

DODD 5200.1-PH, DoD Guide to Marking Classified Documents

DODD 5200.12, Conduct of Classified Meetings

DOD Instruction 5230.27, Presentation of DOD-Related Scientific and Technical Papers at Meetings

DOD Pamphlet No. 5230.25-PH, Control of Unclassified Technical Data with Military or Space Application

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Appendix B**Distribution Statements****Table B-1. Distribution Levels and Codes**

Distribution Statement Level/Code	Description
A	Approved for public release; distribution unlimited
B	Distribution authorized to US government agencies only (reason) (date of determination). Other requests for this document shall be referred to (controlling DOD office).
C	Distribution authorized to US government agencies and their contractors (reason) (date of determination). Other requests for this document shall be referred to (controlling DOD office).
D	Distribution authorized to DOD and US DOD contractors only (reason) (date of determination). Other requests for this document shall be referred to (controlling DOD office).
E	Distribution authorized to DOD components only (reason) (date of determination). Other requests for this document shall be referred to (controlling DOD office).
F	Further dissemination only as directed by (controlling office) (Date of determination) or DOD higher authority.
X	Distribution authorized to US government agencies and private individuals or enterprises eligible to obtain export-controlled technical data in accordance with DODD 5230.25 (date of determination). Controlling DOD office is (insert).

Table B-2. Reasons for Limiting Secondary Distribution

Reasons	Distribution Code						
	A	B	C	D	E	F	X
ADMINISTRATIVE/OPERATIONAL USE. This information describes administrative procedures or operations with technical content (such as equipment maintenance or weapons operations manuals). Such information may be unclassified but is considered sensitive information and its distribution should be limited to entities that need it for Government purposes or to conduct official business with DoD.		X	X	X	X	X	
CONTRACTOR PERFORMANCE EVALUATION. The information derives from the management review of a program, contractor, performance records, or other advisory documents evaluating a contractor program. Routine dissemination of such results outside the designated audience could result in unfair advantage or disadvantage to the contractor.		X			X	X	
CRITICAL TECHNOLOGY. The technology or information is on the US Munitions List or the Commerce Control List and release of the technology or information to other than the designated group will have a negative impact on US military activities or help potential adversaries overcome military deficiencies. Contractors must be registered with DoD to receive export-controlled data.		X	X	X	X	X	X
DIRECT MILITARY SUPPORT. The technical data is export-controlled and of such military significance to another country or a joint US-foreign program that its release for other than direct support of DoD activities potentially jeopardizes an important military advantage of the US. Release can be made to anyone permitted access to unclassified export-controlled data for foreign military sales (X), to any component in the joint program (E), and to recipients as directed by the DoD controlling office or higher DoD authority (F).					X	X	X
FOREIGN GOVERNMENT INFORMATION. The foreign government information furnished to DoD is restricted in its distribution to a designated audience.		X	X	X	X	X	
PREMATURE DISSEMINATION. The information relates to patentable military systems or processes in the developmental stage and disclosure at this time except to a designated audience would compromise DoD's interest in protecting the patentable technology.		X			X	X	
PROPRIETARY INFORMATION. The information is 1) owned by a nongovernmental entity and 2) protected by a contractor's Limited Rights Statement 9LRS or other agreement. Therefore, dissemination is restricted to a designated audience.		X			X	X	
SOFTWARE DOCUMENTATION. Software documentation shall be distributed according to the terms of the software license, which may restrict distribution to a designated audience.		X	X	X	X	X	
SPECIFIC AUTHORITY. The specific authority (Executive Order, statutes such as the Atomic Energy or Stevenson-Wydler acts, Federal regulation, etc.) governing the information restricts its distribution.		X	X	X	X	X	
TEST AND EVALUATION. The information results from testing and evaluation of commercial products or military hardware produced by a nongovernmental entity and routine dissemination of such results outside a designated audience could result in unfair advantage or disadvantage to the manufacturer or producer.		X			X	X	
APPROVED FOR PUBLIC RELEASE. The information is approved for public release and does not contain controlled data.	X						

Appendix C

Sample Classified Report Documentation Page, SF-298

SECRET//X1*(For training purposes only; otherwise UNCLASSIFIED)*

REPORT DOCUMENTATION PAGE				<i>Form Approved</i> <i>OMB No. 0704-0188</i>	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a current valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.					
1. REPORT DATE (DD-MM-YYYY) 12-06-2001		2. REPORT TYPE Summary Report		3. DATES COVERED (From - To) January–December 2000	
4. TITLE AND SUBTITLE (S) Guide to Publishing AFTAC Scientific and Technical Reports Short Title: (U) Publishing Technical Reports				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Richard M. Barone				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Air Force Technical Applications Center CA/STINFO 1030 S. Highway A1A Patrick Air Force Base, Florida 32925-3002				8. PERFORMING ORGANIZATION REPORT NUMBER AFTAC-TR-01-010	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION / AVAILABILITY STATEMENT SECRET//X1 F - Further dissemination only as directed by AFTAC/CA, 1 April 2001, or higher DoD authority.					
13. SUPPLEMENTARY NOTES DERIVED FROM: AFTAC GSSCG, 17 October 2000 DECLASSIFY ON: X1					
14. ABSTRACT (S) This guide provides publishers of AFTAC scientific and technical reports with information that will ensure compliance with DoD directives, American National Standards Institute (ANSI) standards, and Air Force instructions. It acts as a sample technical report, <i>per se</i> . It explains and illustrates proper document organization, design, classification, secondary distribution, and bibliographic format.					
15. SUBJECT TERMS (U) Technical writing (U) Writing (U) Technical Reports (U) STINFO (U) Scientific literature (U) Editing					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT SAR	18. NUMBER OF PAGES XX	19a. NAME OF RESPONSIBLE PERSON Richard M. Barone
a. REPORT SECRET	b. ABSTRACT SECRET	c. THIS PAGE SECRET			19b. TELEPHONE NUMBER (include area code) (321) 494-3871 DSN 854-3871

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. Z39.18

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Appendix D

Revision Checklist for Technical Reports

(numbers in parentheses refer to section of discussion)

Content

- Are all data complete?
- Are all data accurate?
- Are all data unbiased?
- Are all data easily interpreted?
- Are the sources of data, if provided, credible?
- Does the report have a clear statement of purpose?
- Are the limitations of analysis clearly stated?
- Are figures clear and do they aid in analysis?
- Does the report adequately describe research methodology?
- Does the report present all findings and discuss their significance?
- Is the analysis free of unsupported reasoning?
- Are recommendations based on unambiguous interpretations?
- Are references adequate and correct?

Format and Design

- Does the report have an official distribution statement on the cover and title pages?
- Does the report have a Report Documentation Page, SF-298?
- Does the report have the following required elements:
 - Title Page?
 - Notices Page (with commander & director signature blocks)?
 - Abstract (in SF-298)?
 - Table of Contents?
 - List(s) of Figures and Tables?
 - Summary?
 - Introduction?
 - Conclusion?
 - References?
 - List(s) of Symbols, Abbreviations, and Acronyms?
 - Distribution List?
- If the report is classified, does it also have a short title on the cover and title page?
- If the report is classified, has each page been marked individually and the overall classification placed on the cover, title, and back pages?

Guide to Publishing AFTAC Scientific and Technical Reports

- Do the following pages start on a new right-hand (odd numbered) page: title; SF-298; table of contents; page 1; first pages of appendixes, distribution list, and list of abbreviations?
- Are the front matter pages numbered in lower case Roman numerals?
- Are all the figures and tables numbered and labeled properly?
- Are the references properly cited, including title, author, date, publisher, page numbers (if journal article), and document number (if technical report)?
- Does the distribution list include one copy for AFTAC CA-STINFO?
- Does the report have a report number (assigned by STINFO manager for in-house reports or the contractor for contract reports)?

Style

- Is the level of scientific knowledge appropriate for the stated audience?
- Has the computer checked the report for spelling and grammar mistakes?
- Have statistics been put in tables and figures rather than written into the text?
- Have tables and figures been placed near the related text, not at the back of the report?
- Does the report have the best possible format to enhance the message?
- Has an editor or colleague proofread the report?

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1. Journal article
 2. Book, no author
 3. Book, two authors
 4. Book, one author
 5. Web site
 6. Technical report
 7. Government document

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List of Symbols, Abbreviations, and Acronyms

Symbol, Abbreviation, Acronym	Definition
AFEPL	Air Force Electronic Publications Library
AFRL	Air Force Research Laboratory
AFTAC	Air Force Technical Applications Center
ANSI	American National Standards Institute
CAPCO	Controlled Access Program Coordination Office
DID	Data Item Description
DoD	Department of Defense
DTIC	Defense Technical Information Center
NISO	National Information Standards Organization
NTIS	National Technical Information Service
RDT&E	Research, Development, Testing, & Evaluation
SAR	Same as report
STINFO	Scientific and Technical Information
TR	Technical Report
UU	Unclassified Unlimited

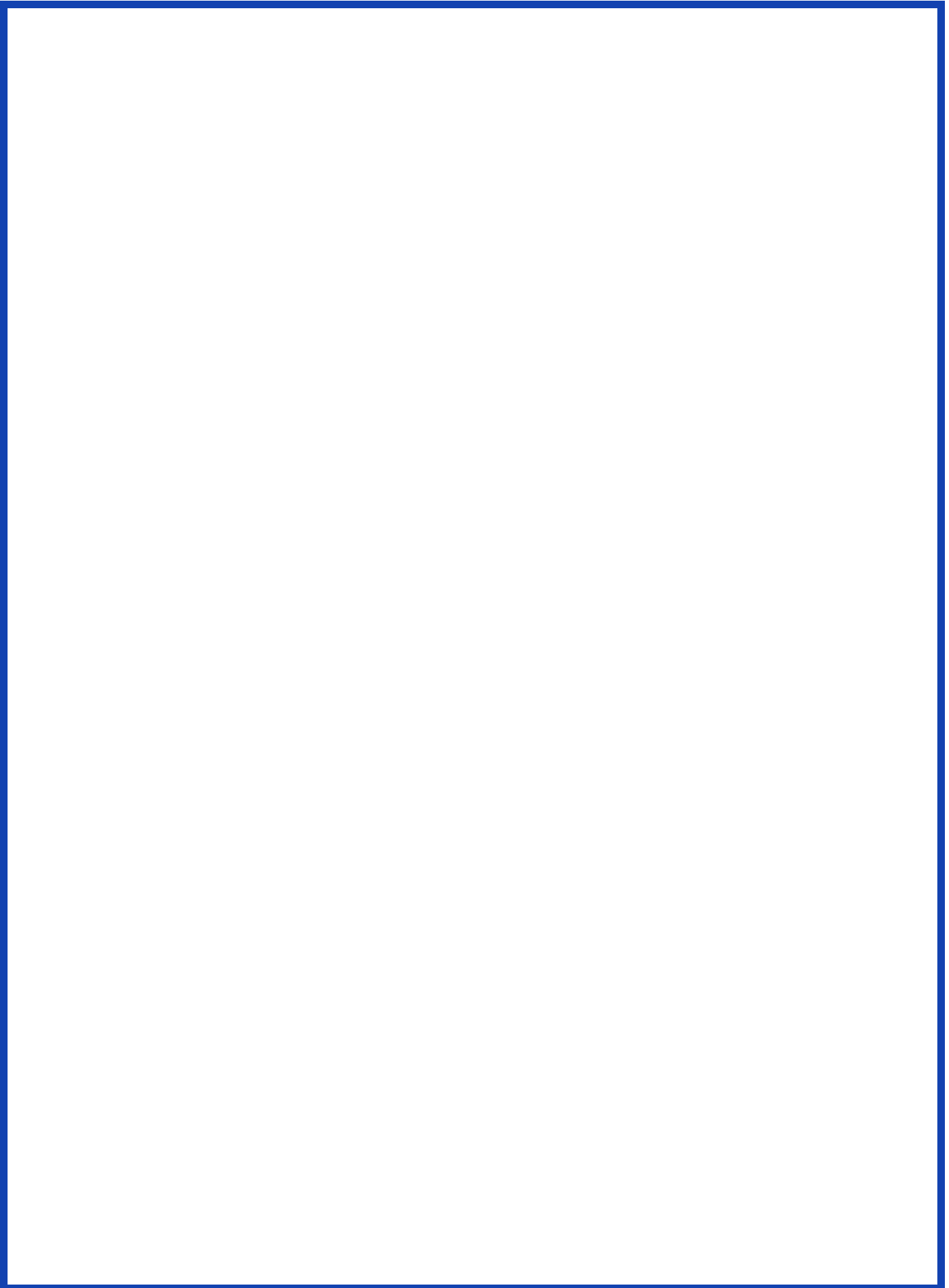
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Distribution List

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AFTAC/TC	1
AFTAC/TM	1
AFTAC/TT	1
AFTAC/CAS	7

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